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Structural Covariates of Homicide Rates

A European City Cross-National Comparative Analysis

Patricia L. McCall
North Carolina State University, Raleigh, USA

Paul Nieuwbeerta
Netherlands Institute for the Study of Crime and Law Enforcement (NSCR), Leiden, The Netherlands & Utrecht University, Utrecht, The Netherlands

Most previous empirical comparative studies of homicide examine homicide rates across nations or subnational units within a single country. This study is the first in which a European cross-national city comparison is made. The article aims to provide insight into the extent that the homicide rates are related to the social and economic forces characterizing a sample of European cities. Derived from theories rooted in classic works, including social disorganization, strain, and urbanism, are six hypothesized effects of structural forces on homicide rates. Analyses show that cities' deprivation and population structure indexes are strong predictors of homicide rates. The predicted effects of unemployment rates, population heterogeneity, and age structure on homicide rates, however, were not consistently corroborated by these results. Comparing Eastern and Western European countries, the authors also find support for the influence of the country's level of development on city-level homicide rates.

Keywords: *city homicides; cross-national studies; European homicides; homicide rates*

Studies of the spatial distribution of crime, including homicide, have their origins in the cartographic or statistical school in the 19th century in Europe. Pioneers such as Guerry (1833), Fletcher (1849), and Quetelet (1847) started empirical studies investigating differences in crime rates across European geographical areas. In the same century, the French scholar Durkheim (1895/1982) questioned how and why rapid socioeconomic changes in European societies caused by industrialization and urbanization fragmented people's social ties, thereby freeing them to deviate from social norms and engage in deviant behavior including crime and homicide. Durkheim was the first scholar to address the crime problem at a structural theoretical level.

In the 20th century, the focus of empirical ecological research and the development of theories on the geographical distribution of crime moved away from Europe

toward the United States. Ecological research made enormous progress in the first decades of the 20th century, especially at the University of Chicago. Studying the city of Chicago, scholars described the distribution of crime and delinquency, including homicide, across neighborhoods and identified structural factors responsible for that clustering (Burgess, 1925; Park, 1925; Park & Burgess, 1925; Shaw & McKay, 1942; Wirth, 1938). In their study of Chicago neighborhoods in the early 1900s, guided by their social disorganization perspective, they in particular found high rates of delinquency in socially disorganized areas often characterized by population heterogeneity, poverty, and high population turnover.

A review of current research on ecological research on crime in general and on homicide in particular shows that the vast majority of today's research is carried out in the United States.[1] A vast body of homicide research exists in the United States that covers a variety of topics, time periods, and levels of analysis. Because of ready availability of macro-level social indicators, aggregate-level studies of homicide characterize much of this literature–typically examining homicide rates across states, metropolitan areas, and/or cities within the United States. These extant homicide analyses have done particularly well to identify classic covariates of homicide at these various levels of geographic location in the United States.

In this article we build on the theoretical and empirical work in the United States but aim to bring the discussion back to its theoretical and empirical origin, that is, the European continent. Following the lead of most criminologists who have studied U.S. homicide rates, we also use a structural approach in our research and argue that the same theories used to study city-level homicide rates in the United States also are applicable to studies of cross-national city-level European homicide rates. Yet this remains an empirical question. Therefore, we address the question: Do those structural forces identified by criminologists as important in explaining homicide rates in the United States also apply in understanding the extent to which social and economic factors affect homicide rates in European cities and countries? We address this question by analyzing data on homicide rates and structural covariates from more than 100 cities from 16 European countries.

By analyzing city-level homicide rates from several European countries, our study is the first that studies aggregate homicide rates in a large sample of European subnational (city) units cross-nationally. There have been a limited number of European studies on homicide that examine the extent to which social and economic factors explain the variation in homicide rates across European cities; however, these typically analyze cities within a single European country (Gartner & McCarthy, 1991; Kim & Pridemore, 2005; Liu, 2005; Pridemore, 2005; Villarreal, 2004). Furthermore, there have also been studies analyzing European homicide cross-nationally. However, almost without exception, the cross-national homicide studies have been conducted using national-level data. Limitations of data availability and comparability across countries, to a large extent, have restricted cross-national homicide research to the national level.[2] Not only have varying definitions of *homicide*

across nations made such cross-national analyses difficult if not impossible, but also the challenge of finding comparable social and economic indicators across nations and at the city level has been insurmountable.

Fortunately, recent efforts have been undertaken to investigate common issues shared by member nations of the European Union (EU) and have produced new sources of data that may serve criminologists in their study of cross-national homicide at subnational levels of analysis. The European Commission's Eurostat has compiled subnational level data from many EU member countries and has worked carefully to ensure comparability of social indicators across countries. The purpose of the current study is to explore homicide rates across this sample of EU cities and examine the extent to which classic covariates of homicide identified in extant U.S. subnational and in cross-national homicide studies explain the variation in their homicide rates. These questions are pursued after reviewing applicable criminological theories.

Theoretical Perspectives on City-Level Homicide

A review of cross-sectional and cross-national analyses of homicide rates finds common theoretical traditions that are grounded in classic criminological theories. Structural theories, including social disorganization, urbanism, and strain/anomie theory, provide central explanations for criminal behavior and are found in most aggregate-level homicide studies (for an overview, see Ousey 2000; K. F. Parker, McCall, & Land, 1999).[3] We build on these earlier studies and test the classic criminological theories that provide structural explanations for homicide. We include social disorganization theory that posits crime is a result of weakened social bonds and networks, Wirth's (1938) urbanism theory that explores the deleterious effects of population growth in urban areas, and Merton's (1938) strain theory that describes the role structural inequalities and relative deprivation play in criminal and deviant behavior. The following brief review of these theories and the research evidence describes the structural forces proposed by these theories as influencing cities' rates of homicide offending. At the end we summarize the review by formulating hypotheses that serve as background for our empirical analysis of European city homicide rates.

Social Disorganization Theory

Durkheim (1897/1951) theorized that rapid social change creates conditions conducive to normative boundlessness and anomie among individuals that lead some people to engage in deviant or criminal behavior. Durkheim (1895/1982) also posited that crime rates are related to a society's stage of development. He (1900/1957) posited that simple, "mechanical" societies were characterized by

higher homicide rates because their members upheld allegiance to family, state, and god and were willing to murder in defense of these loyalties (pp. 114-117). Societies undergoing dynamic social and economic transformations from simple agrarian to modern, industrialized stages experience turmoil, weakened social integration, and rising homicide rates. As societies reach a more advanced industrialized stage, homicide rates decline as human sentiment among individuals becomes stronger (Durkheim, 1895/1982, p. 100). Durkheim's structural approach to analyzing social conditions and social problems among European countries became a basis for the theoretical development of many mainstream sociological perspectives. Structural sociological theories have been applied to the field of criminology providing criminologists with various theoretical foundations for studying the effects that structural forces have on crime.

Shaw and McKay (1942), for example, developed the social disorganization perspective in their study of Chicago neighborhoods in the early 1900s and found high rates of juvenile delinquency in socially disorganized areas often characterized by population heterogeneity, poverty, and high population turnover. This theory has been modified by subsequent scholarly efforts that focus mainly on social control (e.g., Bursik, 1988, 1999; Bursik & Grasmick, 1993; Morenoff, Sampson, & Raudenbush, 2001; Sampson, 1987; Sampson, Raudenbush, & Earls, 1997). Bursik and Grasmick (1993) further developed this perspective by arguing that these types of structural barriers impede development of formal and informal ties that promote mechanisms to control a community's common problems, including crime. As did Shaw and McKay, some of the more recent of these efforts analyzed crime at the neighborhood level, although a large body of literature has employed these concepts to study larger ecological units such as cities, metropolitan areas, and states (e.g., see K. F. Parker et al., 1999).[4]

Numerous U.S. homicide studies have reported evidence consistent with the social disorganization perspective. An impetus for social transition and one of the more consistent predictors of the U.S. homicide rate is family dissolution—typically measured as the percentage of the population that is divorced (Blau & Blau, 1982; Blau & Golden, 1986; Land, McCall, & Cohen, 1990; Lee, Maume, & Ousey, 2003; Maume & Lee, 2003; Rosenfeld, Messner, & Baumer, 2001; Sampson, 1986; Stretesky, Schuck, & Hogan, 2004). Other indicators representing family bonds and the controlling influence of parental supervision include the percentage of female-headed households, percentage of single-parent households, and the percentage of children not living with both parents. In various studies, one or another of these indicators has been combined with other indicators of social disorganization into indexes to measure the concept—often finding support when incorporated into homicide analyses. Examples of such indexes include the structural poverty index (Huff-Corzine, Corzine, & Moore, 1986; Loftin & Hill, 1974; Messner, 1983b; R. N. Parker, 1989; R. N. Parker & Smith, 1979) or the resource deprivation/affluence index (Land et al., 1990; Messner & Golden, 1992).

Urbanism

Wirth (1938) identified social pathologies related to urban settings, such as how population size and population density potentially affect social relationships, reducing social integration and social control. Crime, including homicide, is theoretically one of the resulting problems stemming from urban anonymity and weak social control. Hence, a city's urban population structure or urbanism is related to crime.

A review of the empirical findings shows mixed support for the influence of urbanism on homicide offending. In predicting homicide in the United States, indicators of urbanism such as size of place have shown mixed effects—ranging from statistically significant positive effects (Bailey, 1984; Blau & Golden, 1986; Chamlin, 1989; Messner, 1982; Messner, 1983a, 1983b; R. N. Parker, 1989; Sampson, 1986) and no effect (Loftin & Parker, 1985; Messner, Baumer, & Rosenfeld, 2004; Reid, Weiss, Adelman, & Jaret, 2005; Rosenfeld et al., 2001) to statistically significant negative effects (Bailey, 1984; Chamlin, 1989). Some of these studies have combined city size and population density (population per square mile) into a population structure index that typically finds support in the literature (Land et al., 1990; Lee et al., 2003; Maume & Lee, 2003; Messner & Golden, 1992).

Strain/Anomie Theory

Merton's (1938) strain/anomie theory has directed attention to the potential criminogenic influences of structural inequality. He argued that individuals facing economic hardship and blocked opportunities also may experience feelings of injustice and resentment. Scholars have argued that economic strain, or economic deprivation, may either result in offenders striking out against the sources of strain or produce diffused aggression that stimulates violent behavior (Messner & Golden, 1992). From a macro-structural perspective, in areas suffering an economic decline, criminally predisposed individuals may become further marginalized and the social bonds and networks that might otherwise support law-abiding behavior may be compromised.

Strain/anomie theory and social disorganization posit that poverty levels should be related to crime rates; however, strain theory also emphasizes the importance of inequality on criminal offending (for a review, see Ousey, 2000). Previous homicide research has reported evidence that generalized aggression generated by absolute deprivation in the form of poverty and poverty concentration (Lee et al., 2003; Peterson & Krivo, 1993; Sampson, 1986; Stretesky et al., 2004) and relative deprivation typically measured with the Gini index of income concentration (Harer & Steffensmeier, 1992; Maume & Lee, 2003) are predictive of homicide rates; however, some have found little association between homicide and absolute (Harer & Steffensmeier, 1992) or relative deprivation (R. N. Parker, 1989). Trying to address the disparate findings associated with these economic variables, Land et al. (1990) established that a statistical interrelationship exists among many of these deprivation

indicators and combined them into their resource deprivation/affluence index. This composite index included indicators of poverty and income inequality, as well as other related social and economic forces. Other researchers, using similar techniques, have reported relatively consistent support for the notion that structural indicators of economic deprivation predict homicide rates (Lee et al., 2003; Messner et al., 2004; Reid et al., 2005; Rosenfeld et al., 2001; Stretesky et al., 2004).

The unemployment rate has often been used as an indicator of economic hardship to test hypotheses from strain/anomie theory. Results have been inconsistent, though, with most researchers reporting a negative relationship between unemployment and homicide rates rather than the expected positive relationship (Crutchfield, Geerken, & Gove, 1982; Land et al., 1990; Sampson, 1985). Often, no statistically significant association is found for the unemployment–homicide relationship (Reid et al., 2005; Rosenfeld et al., 2001). Cantor and Land (1985) explained such inconsistencies as reflecting countervailing forces of motivation and opportunity; however, the fact of inconsistent findings remains.

Demographic Composition

Theories related to demographic composition, particularly race and age, have been used to explain homicide rates (Messner & Blau, 1987; Messner & Sampson, 1991). For example, the racial composition of a geographic location, typically operationalized as percentage Black, is often found to be a strong covariate of violent crime rates in U.S. studies. Blau and Golden (1986) suggest that higher violence rates among Blacks might result from frustration and alienation stemming from discrimination. Anderson (1997) argued that violent behavior among some African Americans is a response to the harsh realities of urban underclass living. However, studies often find that percentage Black predicts violent crime even when indicators of strain and social disorganization are controlled (Blau & Blau, 1982). Another interpretation of the race–homicide relationship is that Blacks as well as southern Whites with high rates of violence share a culture of violence, often rooted in poverty and obsession with honor or respect (Anderson, 1999; Miller, 1958; Nisbett & Cohen, 1996; Wolfgang & Ferracuti, 1967).

The age structure of a population is proposed to affect rates of violence (Cohen & Land, 1987; Fox, 1978). Arguments regarding the age–crime-propensity relationship have been advanced by Greenberg (1985) and by Hirschi and Gottfredson (1983). Moreover, the routine activities perspective posits that the presence of large numbers of potential youthful victims can elevate rates of violence (Cohen & Felson, 1979; Cohen, Felson, & Land, 1980; Cohen, Kluegel, & Land, 1981).

Among the demographic indicators incorporated in homicide research, percentage Black is often positively associated with homicide rates and explains a substantial amount of the variance (Blau & Blau, 1982; Maume & Lee, 2003; Messner, 1983b; Sampson, 1985, 1986), though sometimes no relationship between percentage Black

and homicide rates has been found (R. N. Parker, 1989). Some studies have used population heterogeneity indexes to measure the effects of racial population composition and find support for its relationship with homicide (Stretesky et al., 2004).

The age structure, typically measured as the percentage of the population age 15 to 29 years or age 20 to 34 years, is not consistently linked to homicide rates. Findings in cross-sectional studies for that variable are contradictory—rarely positive as predicted (Land et al., 1990; Loftin & Hill, 1974), typically with null effects (Huff-Corzine et al., 1986; Lee et al., 2003; Maume & Lee, 2003; Messner, 1983a, 1983b; R. N. Parker, 1989; Reid et al, 2005; Rosenfeld et al., 2001), and sometimes negatively correlated (Crutchfield et al., 1982; Land et al., 1990; Lee et al., 2003; Loftin & Parker, 1985)—often differing according to level of aggregation. However, time series studies tend to show a positive relationship between the proportion of youth in a population and its homicide rate (Fox & Piquero, 2003).

Hypotheses

To summarize, extant explanations for homicide offending identify structural conditions such as weak social control, economic deprivation, and demographic composition. Although urbanism (population structure), the socially disorganizing effect of family dissolution (divorce), strain (tapped by measures of economic deprivation and resource deprivation), and population composition (percentage Black population) most consistently emerge as important predictors of U.S. homicide rates, other structural forces find mixed support in this literature.

The purpose of our research is to determine the extent to which criminological theories are supported when analyzing a sample of European cities. From classic theories of criminology and the above review of U.S. cross-sectional homicide research, we derive the following hypotheses for our analysis of European city homicide rates:

Hypothesis 1: Social disorganization—Structural impediments to formal and informal social control are directly related to homicide. Cities that are characterized with population heterogeneity and with weak social ties as well as poor parental control are more conducive to criminal offending such as homicide.

Hypothesis 2: Urbanism is positively correlated with homicide. That is, larger, more densely populated cities should exhibit higher rates of homicide.

Hypothesis 3: Strain or economic hardship is positively correlated with homicide offending. Cities with higher levels of economic deprivation will exhibit higher rates of homicide.

Hypothesis 4: Weak labor markets create economic strain in the form of unemployment. Therefore, cities with high levels of unemployment will also have high homicide rates.

Hypothesis 5: Age structure is associated with criminal offending—that is, young persons are more likely to be offenders as well as victims of crime. Therefore, cities with high proportions of youthful populations will have high homicide rates.

Hypothesis 6: As Durkheim (1895/1982) described, societies undergoing dynamic social and economic transformations to modern, industrialized stages experience turmoil, weakened social

integration, and rising homicide rates. Eastern European countries more closely resemble this stage of development than the more advanced industrialized countries of Western Europe. Therefore, less industrialized countries (i.e., Eastern European countries) are characterized by higher homicide rates than advanced, industrialized countries (i.e., Western European countries).

These hypotheses are tested to identify those social and economic factors that influence homicide rates across a sample of European cities. We begin with a discussion of the data set which makes this analysis possible: Eurostat's (2004) Urban Audit.

Data and Method

Eurostat is the statistical agency of the European Commission, and the agency's mission is to provide the EU with a high-quality statistical information service. Compiled by Eurostat, the Urban Audit provides social and economic indicators for large- and medium-sized cities within the EU and the candidate countries.[5]

All variables in the current analysis are derived from the Urban Audit data set. The reporting countries provided data for which they had information—either for 2001, which was the target year for data collection by Eurostat, or the most recent information available prior to 2001. The data set used in the current study represents the city level of analysis and includes information for 285 large- and medium-sized cities within the EU.[6] Unfortunately, homicide data and variables we identified as the best indicators of the social and economic forces for our study are not available for all 285 cities included in the Urban Audit. The data set contains information on homicide rates for only 152 cities. In addition, in 35 of these 152 cities, one or more indicators of selected explanatory variables are missing. Therefore, our analyses are based on 117 cities representing 16 European countries.[7] Appendix A presents a list of the cities in each country.

Measures

Dependent variable. The dependent variable in our analysis is the city homicide rate for 2001 and is calculated as the number of homicides reported to the Eurostat office divided by the number of residents of each city and then multiplied by 100,000. Eurostat collected data from the member and candidate countries for 2001 or for the year for which homicide data were most recently available. Therefore, homicide data mostly represent 2001 statistics; however, for some countries, the most recent are homicide data that represent 1999 or 2000 figures.[8] The homicide data were derived either from each country's vital statistics offices (cause of death mortality statistics) or from their official police statistics (crimes reported to the police).[9] Nevertheless, when comparing Eurostat's homicide measure with the police statistics from a recent U.K.'s Home Office report of average homicide rates for 15 European country's capital cities, we find a bivariate correlation of .94 (Barclay &

Tavares, 2003). Therefore, these data seem to be relatively good indicators of homicide across these cities. The mean homicide rate for our sample of cities is 2.1 per 100,000; however, substantial variation exists with homicide rates ranging from 0 to 13.96 across cities. To reduce skewness and induce homogeneity in error variance we converted the homicide rates to their natural logarithmic form.[10] The logged homicide rates for our sample of cities closely approximates a normal distribution.

Explanatory variables. The key explanatory variables in our analyses are indicators of the central concepts hypothesized to be related to homicide rates: the urbanism of a city, population heterogeneity, economic deprivation, levels of unemployment, proportions of youthful populations in a city, and level of economic development.

To measure the urbanism of a city, we constructed a population structure index. This is an additive index consisting of the residential population size and population density variables (both in natural log forms)—a measure established in previous homicide studies (Land et al., 1990; Lee et al., 2003; Maume & Lee, 2003; Messner & Golden, 1992; Rosenfeld et al., 2001).

We used four variables to create a measure for the level of economic deprivation in a city, including percentage of lone-parent households, percentage of households reliant on Social Security, percentage of households with one half of national mean income, and median disposable annual household income.[11] To create a deprivation index and retain as many cases as possible for our analysis, we created z scores for each of these variables and then averaged the z scores for those variables available for each city.[12] By allowing our measure to rely on different numbers of variables available for different cities, we were able to retain as many cities as possible for the analyses (i.e., $N = 117$).[13]

The level of population heterogeneity in a city is measured by the percentage of residents who were born in non-EU countries. Unfortunately, this measure is unavailable for 19 of the 117 cities (18 of the 19 representing cities in the United Kingdom). Therefore we estimate our model with and without this measure. With the exception of the percentage lone-parent households variable that is included in the deprivation index, the population heterogeneity measure is our unique indicator of social disorganization for these cities.[14] The Urban Audit data set does not provide measures for marital status at the city level that would allow us to test for the socially disorganizing effect of divorce. To some extent, the lone-parent households may represent this concept.

A city's level of unemployment is measured by the percentage of men who are unemployed relative to those men who are considered economically active (in the civilian labor force). Finally, the proportion of the youthful population in a city is measured by the percentage of residents that are between age 15 and 24 years.

A dichotomous measure representing the two regions represented in this data set, Eastern Europe (coded *1*) and Western Europe (coded *0*), is included to test whether a country's level of economic development is related to their cities' homicide rates (see Appendix A with Eastern European countries indicated).

The explanatory variables included in our analysis include most of the classic structural covariates in investigations of homicide rates across U.S. states, cities, and

metropolitan areas (Land et al., 1990; Lee et al., 2003; Maume & Lee, 2003; Messner & Golden, 1992; Rosenfeld et al., 2001) and provide sufficient indicators for our examination of how these structural covariates explain the variation in homicide rates across EU cities.

Table 1 presents the descriptive statistics for the variables used in our analyses. The descriptive statistics indicate that the mean homicide rate for the cities is 2.1 with a standard deviation of 2.13 indicating substantial variation in homicide rates across our sample of European cities. We use the logged homicide rate in our models, and the mean for this is 0.36. On average, 10% of the economically active males in these cities are unemployed, and almost 6% of these cities' residents are non-EU nationals. Fourteen percent of the population is between age 15 and 24 years in an average city. Thirteen (11%) of the 117 cities are located in Eastern European countries.

Appendix B provides this descriptive information for the variables that made up the deprivation and population structure indexes included in these models. From Appendix B, we see that the cities in our sample have an average population size of approximately 443,000 and that 7% of the households are headed by a lone parent—a percentage relatively smaller than what characterizes most U.S. cities. Among the economic indicators representing these cities, we find that the median disposable household income is 14,675 euros, equivalent to approximately US $12,475 in 2001.[15] The other economic indicators reveal that almost one fourth of the households in our sample of cities have incomes that are less than one half the national average and just over 15% of households are reliant on Social Security. Overall for our variables included in this analysis, the standard deviations show that there is substantial variation in socioeconomic characteristics across the cities.

Findings

We start with a description of homicide rates in the 117 European cities in 16 nations available in the Urban Audit data set. More than one fourth (27%) of these European cities has homicide rates less than 1 per 100,000 and more than one third (33%) has rates between 1 and 2 homicides per 100,000 population. The remaining cities have homicide rates that range between 2 and 3 in about one fifth (21%) of the cases and more than 3 homicides per 100,000 population in 12%—with 4% of our cities' homicide rates more than 10 per 100,000. The rates for Eastern European cities are higher (5.4 per 100.000) than for Western European cities (1.7 per 100.000). In any case, the majority of the European homicide rates are low relative to U.S. homicide rates. The wide variation in homicide rates across these cities raises the question of whether criminological theories and associated homicide relationships established in earlier homicide studies are supported when using data based on a sample of European cities.

Table 1 provides bivariate correlations for the variables used in our analyses. These correlations give a preliminary insight into the extent to which our structural covariates explain variation in these European homicide rates. The homicide literature described

Table 1
Bivariate Correlations and Descriptive Statistics for Variables in the Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	*M*	*SD*
1) Homicide rate (logged)		.38*	.09	.06	.14	.33*	.36*	.36	1.04
2) Deprivation index			.14	–.28*	.30*	–.00	.52*	.17	.82
3) Unemployed males				–.36*	.50*	–.04	.17	10.16	4.55
4) Percentage Non-European Union nationals[a]					–.60*	.34*	–.16	5.85	4.72
5) Age Composition (Percentage 15- to 24-year-olds)						–.29*	.24*	14.17	2.62
6) Population structure index							–.06	13.11	1.35
7) Eastern Europe indicator								.11	.32

Note: $N = 117$.
a. $N = 98$.
*$p \leq .05$, two-tailed test.

earlier emphasizes that cities characterized by high levels of economic deprivation, unemployment, population heterogeneity, young residents, population size and density, as well as located in societies at lower levels of development are likely to have relatively high rates of homicide offending. The correlations show support for some of the hypotheses. In particular, deprivation and population structure measures are significantly associated with homicide rates. To investigate the unique contribution of each of the covariates more closely, we turn to the multivariate analyses.

Multivariate Analyses

In our study, we attempt to control for the likely structural differences that exist across these European cities and the level of development of these countries. Therefore, we also estimate a series of ordinary least squares (OLS) models to test our hypotheses. Because the dependent variable—the logged homicide rate—is approximately normally distributed, we estimate linear models in which the logged homicide rate in each city is defined to be dependent on the six explanatory variables as follows.

$$\begin{aligned}\text{Ln(Homicide rate)} = \beta_0 &+ \beta_1 \text{ Deprivation} + \beta_2 \text{ \% Unemployed} \\ &+ \beta_3 \text{ \% Non-European Union Nationals} + \beta_4 \text{ \% Young} \\ &+ \beta_5 \text{ Urbanism} + \beta_6 \text{ Eastern Europe} + \varepsilon\end{aligned}$$

The results of the multivariate analyses assessing the impact of the explanatory variables on homicide rates in European cities are presented in Table 2. To show the robustness of our findings, we estimated the models several ways. Models 1 through 3 (Panel A) present the results that assess the impact of these variables on homicide rates in European cities and Models 4 through 6 (Panel B) replicate these models but also include the dichotomous measure for European region. In addition, we ran the models

for all 117 cities as well as for a subset of 98 cities that exclude the 19 cities for which we have no information on our measure of population heterogeneity. Initially, the models are estimated with the population heterogeneity measure excluded: Model 1 includes the subset of 98 cities (for which we have information on all variables) and Model 2 includes our sample of 117 cities (for which we do not include the measure for population heterogeneity—percentage non-EU nationals). These two models are presented as a base of comparison. Finally, Model 3 includes population heterogeneity and is restricted to the subset of 98 cities for which we have information on all variables. Although the results vary somewhat between these models, we highlight the consistency in the overall findings across the models.

Consistent with our hypothesis (Hypothesis 2), the population structure exhibits a significant relationship in the theoretically expected positive direction with the homicide rate, that is, the higher the urbanism of a city (measured by an index consisting of the unit population size and population density), the higher the homicide rate in that city. Theoretically, homicide can thus be regarded as one of the resulting social pathologies stemming from urban anonymity and weak social control (Wirth, 1938).

Another finding consistent with our hypothesis (Hypothesis 3) is with respect to levels of economic deprivation in cities. The regression coefficients representing the effects of deprivation are significant and positively correlated with the homicide rates. In addition to its significance, this index explains the greatest amount of variance in homicide rates among the covariates in the model.

The results also support our last hypothesis (Hypothesis 6). Models 4 through 6 show the results of our OLS estimation with the effects of Eastern Europe region. The coefficient for the Eastern Europe indicator is positive and statistically significant as predicted. Therefore, all else equal, the Eastern European cities in our sample have higher rates than the Western European cities.

The findings for Models 4 through 6 also substantiate the results for Hypothesis 2 and 3. When we control for Eastern European countries in Models 4 through 6, the results are very similar to the models in which we do not control for level of development. Our measures for the cities' population structure and level of economic deprivation are significantly and positively correlated with their homicide rates.

Not all our hypotheses are corroborated, however. Inconsistent with our hypotheses (Hypothesis 1, Hypothesis 4, and Hypothesis 5), we find that the cities' levels of unemployment, population heterogeneity, and young residents are not consistently correlated with the cities' rates of homicide.[16]

Summary and Conclusion

This article provides insight into the extent to which homicide rates vary across our sample of European cities and the extent to which the variation is related to differences in the social and economic forces characterizing those cities. Using OLS

Table 2
Ordinary Least Squares Regression Models of European City Homicide Rates (ln), $N = 98$ or $N = 117$

	Panel A					
	Model 1 ($N = 98$)		Model 2 ($N = 117$)		Model 3 ($N = 98$)	
	b	*SE*	*b*	*SE*	*b*	*SE*
Deprivation index	.421*	.119	.434*	.109	.453*	.121
Unemployed males	–.002	.023	–.001	.020	.004	.023
Percentage young	.062	.044	.056	.039	.091*	.048
Population structure	.335*	.075	.289*	.066	.312*	.076
Percentage Non-European Union nationals					.038	.027
Intercept	–5.013*	1.286	–4.297*	1.120	–5.404*	1.309
Adjusted R^2	.252		.245		.260	
	Panel B: Controlling for Eastern Europe					
	Model 4 ($N = 98$)		Model 5 ($N = 117$)		Model 6 ($N = 98$)	
	b	*SE*	*b*	*SE*	*b*	*SE*
Deprivation index	.234*	.141	.281*	.122	.272*	.144
Unemployed males	–.004	.022	–.005	.020	.000	.023
Percentage young	.051	.043	.052	.038	.075	.048
Population structure	.331*	.073	.297*	.064	.313*	.075
Percentage Non-European Union nationals					.031	.026
Eastern Europe Indicator	.844*	.357	.793*	.308	.795*	.358
Intercept	.399*	–4.863	–4.359*	1.093	–5.193*	1.285
Adjusted R^2	.287		.281		.290	

*$p \leq .05$, one-tailed test.

regression techniques, the results show that there is substantial variation in homicide rates in our sample of European cities, across Eastern and Western European countries and across cities within these countries. The results also show that some of the classic covariates identified in earlier studies are important and robust predictors of homicide in this analysis. Consistent with our hypothesis, population structure exhibits a significant relationship with the homicide rate: the higher the city's urbanism, the higher the homicide rate in that city. Also in line with our predictions, we find that the higher the level of deprivation in a city, the higher the homicide rate. In addition, the country's level of development has an impact on the city-level homicide rate. Our other three hypotheses however were not corroborated by our results.

When we consider the relative consistency with which our social and economic indicators have found support in previous studies of homicide, we are confident that our findings are substantiating social facts in Europe that exist regardless of national borders. Our findings substantiate that the social and economic forces associated with large urban settings and with economic hardship (along with weak parental supervision) are structural characteristics that are conducive to homicide offending in these EU cities as established in studies of U.S. homicides. European policy makers and city planners can refer to and rely on these findings as they work to reduce crime and other social problems in their communities.

Homicide researchers and policy makers should also find our nonsignificant findings of interest—for example, the absence of a significant influence of non-EU nationals. The percentage of non-EU nationals variable was employed to measure our concept of *population heterogeneity* (as related to social disorganization) and is the best measure the data set provides. Yet this measure is likely to include such populations as skilled immigrants from Asia or the Americas as well as unskilled immigrants from Morocco or Algeria, for example. Skilled migrants would not characterize the disorganizing influence of the migration flows described by Shaw and McKay (1942) in their work nor of the economically alienated U.S. black population.[17] Therefore, our general measure of non-EU nationals may blur what could be important social and/or economic forces relative to the concept of *population heterogeneity* (see Tonry, 1997, for issues related to ethnicity and crime in Europe). The absence of support for this hypothesis does not indicate that population heterogeneity is an unimportant factor in European cities relative to homicide. Researchers and policy makers should attempt to identify and compile more refined measures of this concept in future cross-national, city-level studies.

Similarly, the lack of support for the hypothesis on the relationship between unemployment (as an indicator of economic strain) and homicide rates should also be of relevance to researchers and policy makers. It is important to note that many European countries provide unemployment and other social benefits that cushion the economic hardship for its citizens in financially depressed periods. As Messner and Rosenfeld (1997) noted, European countries' political institutions are characterized by Esping-Anderson's (1990) concept of *decommodification*—the efforts by governments to reduce the hardships of economic downturns on society's members by providing financial (welfare) support (Maume & Lee, 2003; Savolainen, 2000). Welfare support in these countries is posited to reduce strain among unemployed populations and thereby reduce the adverse effect economic strain could have on homicide offending (Messner & Rosenfeld, 1997).[18] This is a relatively unexplored relationship, particularly across different political contexts, that is worthy of further examination.

How do these findings inform us about the extent to which classic criminological theories are relevant to our understanding of homicide offending in European cities? Notwithstanding the unique backgrounds of these European cities (and countries),

criminological theories have identified structural forces that influence violent behavior across geographic areas—forces that have likewise been identified fairly consistently across U.S. macro-level homicide studies. To begin, the social pathologies associated with urban settings (Wirth, 1938) are demonstrated and further documented in this study of European cities. The detrimental effects of urban anonymity and ensuing weak social controls among its residents are well established in the criminological literature (Land et al., 1990; Lee et al., 2003; Messner & Golden, 1992; Rosenfeld et al., 2001) and are further supported in our findings and in most recent homicide research.

Social disorganization and (economic) strain theories receive support in the current study as they have in the vast body of homicide literature. Although our measure of economic deprivation does not allow us to assess the unique impact of parental supervision (lone-parent households) or impoverishment (households with income less than one half the mean national income), economic deprivation emerges in the current study as a classic covariate of homicide offending. However, in spite of the well-established age–crime relationship, the driving force between age and homicide offending is allusive in cross-sectional studies. Researchers have yet to discover what appear to be the dynamics of youthful population composition and violent offending.

Finally, some remarks about data limitations are warranted. The data set used in this article is unique because it is the first to include homicide rates and structural covariates at the subnational level across several European countries. Admittedly, however, the data have several limitations. First, the sampling procedure is unclear except for Eurostat's decision to include medium and large cities. Yet comparisons between the total (285) and subsample (117) reveal hardly any substantially different findings (see endnote 6). So, the robust nature of our findings gives us reason to have confidence in the generalizability to European cities not included in our analyses. Second, but related, the data set does not include other industrialized countries outside the EU that would be interesting to include in a cross-national city comparison. We might expect that advanced industrialized countries have lower homicide rates, developing countries would have higher homicide rates, and levels of economic inequality may have more pronounced effects on homicide rates (Pratt & Godsey, 2003). Third, the source of the homicide data is unclear—we do not know the extent to which these data are derived from police records versus mortality statistics, which would be a more reliable source for comparisons across countries. Nevertheless, comparability with other sources of homicide offending suggests these data are worth exploring.

We would like to conclude by arguing that it is important to continue down this road by replicating these aggregate-level homicide studies and expanding the sample of EU cities to include other cities within these European countries and within other non-European countries.

Researchers are often dependent on major statistical organizations such as Eurostat for these types of data collection efforts. Nevertheless, with increasing globalization, pressure from political leaders, and concerted efforts by social scientists and policy makers, these data should be forthcoming—if not in the near future, certainly in time.

Appendix A
The 16 Countries Included in the Analysis (*N* of cities = 117)

Austria (1): Linz; **Belgium** (1): Bruxelles; **Czech Republic**[a] (3): Ostrava, Praha, Usti nad La; **Denmark** (4): Aalborg, Aarhus, Köbenhavn, Odense; **Estonia**[a] (1): Tallinn; **Finland** (1): Helsinki; **France** (23): Amiens, Besançon, Bordeaux, Caen, Clermont-Fe, Dijon, Grenoble, Le Havre, Lille, Limoges, Lyon, Marseille, Metz, Montpellier, Nancy, Nantes, Orléans, Reims, Rennes, Rouen, Saint-Etien, Strasbourg, Toulouse; **Germany** (33): Augsburg, Berlin, Bielefeld, Bochum, Bonn, Bremen, Darmstadt, Dresden, Düsseldorf, Erfurt, Essen, Frankfurt, Freiburg, Göttingen, Halle an der Saale, Hamburg, Hannover, Karlsruhe, Köln, Leipzig, Magdeburg, Mainz, Mönchenglad, Mülheim, Moers, München, Nürnberg, Regensburg, Schwerin, Trier, Weimar, Wiesbaden, Wuppertal; **Hungary**[a] (4): Budapest, Miskolc, Nyiregyhaza, Pecs; **Lithuania**[a] (2): Kaunas, Vilnius; **Luxembourg** (1): Luxembourg; **Latvia**[a] (1): Riga; **Netherlands** (5): Arnhem, Eindhoven, Heerlen, Rotterdam, Gravenhage; **Slovakia**[a] (3): Banska, Byst, Nitra; **Spain** (17): Badajoz, Barcelona, Las Palmas, Logroño, Madrid, Málaga, Murcia, Oviedo, Palma di Majorca, Pamplona/Ir, Santiago de Compostela, Sevilla, Toledo, Valencia, Valladolid, Vitoria/Gas, Zaragoza; **United Kingdom** (18): Aberdeen, Belfast, Birmingham, Bradford, Cardiff, Derry, Edinburgh, Exeter, Gravesham, Leeds, Leicester, Lincoln, Liverpool, Manchester, Newcastle, Sheffield, Stevenage, Worcester.

a. Eastern European countries.

Appendix B
Bivariate Correlations and Descriptive Statistics for Variables in the Indexes, *N* = 117 Unless Otherwise Indicated

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	*M*	*SD*
1. Homicide rate (logged)		.34*	.16	.32*	–.35*	.31*	.26*	.36*	.36	1.04
2. % Lone-parent households[a]			.12	.39*	–.45*	.10	.06	.50*	6.90	2.90
3. % Households w/ one-half national mean income[b]				.72*	.08	–.02	.27	–.08	20.58	17.02
4. % of households reliant on Social Security[b]					–.61*	–.12	–.07	.55*	15.39	12.18
5. Median disposable household income[c]						–.12	.22	–.68*	14676	5823
6. Population size (logged)							.47	–.02	12.63	.82
7. Population per square kilometer (logged)								–.08	.48	.74
8. Eastern Europe indicator									.11	.32
Population size (thousandths)									442.9	492.0
Population per sq kilometer									2.09	1.83

a. $N = 99$.
b. $N = 74$.
c. $N = 87$.
*$p < .05$, two tailed test.

Notes

1. For a thorough review on the history of European and North-American research on urban crime see Bruinsma 2007.

2. National-level data used in cross-national analyses primarily have been compiled over time by the World Health Organization (WHO) and Interpol as well as the United Nations' *Demographic Yearbook* (a source for covariates of crime) over time and provide researchers with measures of homicide and some of the classic covariates of homicide.

3. The culture of violence is another perspective found in the U.S. homicide literature but is excluded from the current analysis because this unique characteristic associated with the southern region of the United States does not have an identified corollary in Europe. Furthermore, because the body of homicide studies is so vast and to make the review more manageable, we omit cross-national level homicide studies and those U.S. and cross-national studies that employ disaggregated (race-, sex-, relationship-specific) homicide rates as well as intranational and times-series, cross-national homicide studies.

4. The theoretical logic of informal networks and social bonds brought into more recent versions of social disorganization theory are designed to explain community dynamics and lower aggregate-level units of analysis, such as the neighborhood level. Nevertheless, we argue that the nature of social disorganization within a city may be captured with indicators found to be correlated with delinquency rates a la Shaw and McKay (1942) and has been demonstrated to be an important element in a number of city-level homicide analyses. Some of the same ideas from classic versions of social disorganization have generated the systemic theory that also has been used to explain urban crime.

5. One of the main goals in the creation of the Urban Audit was to systematically collect and make available urban statistics on European member nations' living conditions. The Urban Audit was conducted at the initiative of the Directorate-General for the Regional Policy at the European Commission, in cooperation with Eurostat and the national statistical offices of the 25 current member states plus Bulgaria and Romania. For more details about these data, we refer to the *Urban Audit Methodological Handbook* on the Eurostat Web site at www.europa.eu.int/comm/eurostat/ and the Urban Audit data on "New Cronos."

6. Eurostat's selection criteria for the participating cities included (a) cities in each country should represent about 20% of the population in that country and represent a good geographical distribution within the country, (b) coverage should include large- and medium-size cities, and (c) there should be data available, and the comparability of data should enable comparative analyses between the cities. The "sampling" procedure was closely and specifically designed by Eurostat, each European country's national statistical organizations, and the cities within the countries.

7. On closer inspection of the homicide data, homicides for Belgium cities seemed suspiciously high—for example, more than 3 times higher than data reported for Brussels by the British Home Office. We suspect Belgium reported completed and attempted homicides to Eurostat—resulting in the high homicide figures for Belgium cities in the Urban Audit data set. Therefore our analyses were conducted excluding Belgium cities except Brussels for which we estimated their homicides (30 for 2001) based on data from the Home Office report (Barclay and Tavares, 2003, page 11).

To determine the degree to which our subsample of 117 cases may create a selection bias, we compared descriptive statistics for the full set of data 285 with our reduced sample of 117 cases. The only substantial difference between the cities' mean statistics was the percentage of non-EU nationals that was larger in our subsample that the total sample (6% vs. 3.5%). This is largely because much of the missing homicide data was in some of the Eastern European countries including Poland, Romania, and Turkey that had relatively low percentages of non-EU nationals compared to some of the Western European countries that likely had more economic incentives to offer willing migrants. The following are the means for the remaining variables including means for the total sample ($N = 285$) juxtaposed with those for the subsample ($N = 117$): homicide rate (2.6/2.1), percentage unemployed males (12/10), percentage young (15/14), population size (438,000/443,000), percentage lone-parent households (6.4/7), medium disposable income (15,000/14,600), percentage receiving one half the mean national income (23/24), percentage of households reliant on social support (12.6/15), Eastern European

countries (7/11). Substantively, with regard to the results, the findings are robust across the various models estimated and the percentage of the non-EU nationals only approaches statistical significance in one model that included the Eastern European country indicator variable.

8. Most aggregate-level homicide studies employ multiple years of homicide data circa the year of interest and average those data to reduce the amount of year-to-year fluctuation typical of a rare phenomenon such as homicide. We caution the reader that any one of these city's data may not represent typical homicide rates because we have access only to one year of data from the Urban Audit. Nevertheless, we are somewhat confident with these data to the extent that they are comparable with the 15 cases from the British Home Office. Furthermore, our analysis includes two subsamples of the Urban Audit data set, and those results are robust across the subsample.

9. We have no indication of the extent to which the data included in this analysis represent cause of death statistics or police statistics (see LaFree, 1999, for a discussion of data sources for cross-national homicide). At the time of manuscript preparation, Eurostat had not prepared detailed information regarding the specific source for these data from each country.

10. Five cities reported zero homicides. Therefore when calculating the natural logarithm we added 0.5 to each homicide rate.

11. Unfortunately, the Urban Audit data set does not provide the detailed income information to allow us to compute a Gini index. Therefore, we have no measure of income inequality in our model.

12. The factor scores generated from the principal components analysis (using pairwise deletion of missing data) are percentage lone-parent households (.693), percentage households with less than one half the national average income (.622), percentage households reliant on Social Security (.769), and median disposable household income (–.686). We multiplied median household disposable income by –1 to make it a theoretically consistent indicator with the other "deprivation" indicators.

13. Therefore, some cities' measure of deprivation is based on fewer than four variables. Sixty-seven (55%) cases included data for all four variables, 12 (10%) for three of the variables, 7 (5%) for two variables, and 36 (30%) for one variable (typically the percentage lone-parent households—mostly made up of the UK cities—but also median disposable income—mostly Spain) in the index. Our decision was based on our attempts to maintain more than 100 cases to enable us to invoke the central limit theorem.

14. Many EU countries do not systematically collect information regarding the racial composition of their population (Tonry, 1997). Some will record information regarding country of birth and also information for second-generation immigrants. Therefore, the percentage of the population who are non-EU nationals was the best indicator of population heterogeneity available from this data set.

15. Currency conversion rates according to the European Central Bank—http://www.ecb.int/stats/exchange/ eurofxref/html/—which shows the 2001 euro valued approximately .85 of the dollar (one euro = 85 cents). Although this average household income figure is very low relative to that for U.S. cities, these EU countries are primarily socialist based and have higher tax rates than the United States. This EU "disposable" income is what they have after their medical insurance and other similar types of living expenses are covered by the government. See also Eurostat (2005) for detailed discussion of data collection.

16. Note though that in Model 3 the parameter for the effect of percentage young approaches statistical significance. Because it is the only model, we are reluctant to interpret this result as a sufficient corroboration of Hypothesis 5.

17. Without more substantive studies of the impact of nationality, race, and ethnicity on homicide offending in European countries, and without systematically collected measures available to best capture the differential social and economic backgrounds they entail, homicide studies of European cities will not be able to assess the relationship between population heterogeneity and homicide rates.

18. Because our measure of welfare support was a component of the deprivation index, we were not able to distinguish its unique effects on homicide.

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Patricia L. McCall is professor of sociology at North Carolina State University. Her research is embedded in the study of crime and social control. Her most recent efforts involve the analyses of aggregate-level homicide and suicide rates and have identified social and economic factors that explain the variations in these phenomena across geographic locations and over time. Other areas of research include modeling criminal careers, juvenile justice program effectiveness, projections of juvenile violent crime rates, and domestic violence case processing.

Paul Nieuwbeerta is senior researcher at the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR) in Leiden, The Netherlands. He also is professor of sociology in the Department of Sociology at the Utrecht University in Utrecht, The Netherlands, and a member of the Interuniversity Centre for Social Science Theory and Methodology (ICS). His research interests include modeling criminal careers, the development of crime over the life course, homicide, and international comparative research.